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Consumption in Ireland: Evidence from the Household Budget Surveys, 1994-95 to 2004-05

Petra Gerlach-Kristen[1]

Abstract: This paper analyses consumption in Ireland using household survey data. Studying surveys from 1994-95, 1999-2000 and 2004-05, we find that the median non-mortgage household tended to consume more than disposable income in the 1990s but apparently started spending in line with income by 2004-05. The initial high consumption may reflect expected income growth at the time. Mortgage households seem to have consumed in line with income in the 1990s but to have started saving by 2004-05. This may relate to the increase in the average mortgage size. A closer analysis of the 2004-05 survey shows that households receiving their income entirely from state transfer payments seemed to consume their disposable income, and sometimes more. Renters tended to consume more than they earned, while higher mortgages depressed consumption.

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1. Introduction

Since the collapse of the real-estate bubble, consumption in Ireland has declined for five years in a row. One reason for this is the increase in unemployment and uncertainty about the labour market outlook. Another factor are increased taxes and reduced state benefits. A third is deleveraging. It has been suggested that mortgage borrowers are trying to reduce debts fast because of the high uncertainty surrounding future house prices. This deleveraging is achieved by consuming less and using the savings for repayment.

This paper tries to contribute to the understanding of consumption patterns in Ireland. We study household consumption using the Irish Household Budget Survey (HBS), which is conducted by the Central Statistics Office (CSO) on a roughly five-yearly basis. We analyse data from the 1994-95, 1999-2000 and 2004-05 surveys. Data from the 2009-10 survey are expected to be published later in 2012. Overall, over 30,000 households were surveyed in these three HBS rounds. Which households were given the questionnaires differed from survey to survey, so that we have a series of cross-section data sets, and not a panel.

The paper is structured as follows. Section 2 provides a brief review of the literature on consumption. Section 3 describes the data. We show consumption and income distributions for the different surveys and present data on demographic factors that might influence household consumption, such as age and family size, employment details and financial characteristics.

Section 4 estimates consumption functions using these household characteristics and presents simulations. We first discuss how consumption patterns of the median household seem to have changed from 1994-95 to 2004-05. We find that households with a mortgage initially consumed roughly what they earned, but that by 2004-05, the median mortgage household had started to save. Households without a mortgage tended to consume more than they earned in the 1990s. Their consumption seems to have dropped back to disposable income in the 2004-05 survey.

To explore in more depth how demographic, employment and financial household characteristics impact on consumption, we next concentrate on the 2004-05 survey. We find households whose income stemmed entirely from state transfer payments appeared to consume their entire disposable income, and sometimes more. Savings were high for farming households, which might be due to income uncertainty, and for households with a mortgage, particularly if this was large. These savings may have been accumulated either to meet future mortgage payments or to move up the property latter. Finally, renters tended to consume more than they earned, perhaps because of expected income increases. Section 5 concludes.

2. Brief literature review

The literature on consumption is vast. The three classic references are Keynes (1936), Modigliani and Brumberg (1954) and Friedman (1957). Keynes (1936) argued that consumption increases as income rises, but that the marginal propensity to consume out of income decreases as income rises. Thus, households on high incomes tend save, while households on very low incomes consume what income is available.

Modigliani and Brumberg (1954) argued that consumption follows a life-cycle pattern. Young households consume more than they earn, by borrowing against their future income. In middle age, these debts are paid back and savings are made, which are drawn down in old age. The marginal propensity to consume thus varies over the life cycle.

Friedman (1957) posited the permanent income hypothesis. According to this, households' consumption reflects what they expect to earn in steady state, and the marginal propensity to consume out of this permanent income is unity. Transitory income increases or decreases should not cause changes in consumption, so that consumption evolves more smoothly over time than disposable income. A large number of papers have tested the permanent income hypothesis (see e.g. Hall, 1978, Hall and Mishkin, 1982, Bernanke, 1985, Campbell and Mankiw, 1990, and Attanasio and Browning, 1995). Uncertainty about future income, coupled with risk aversion, is one of the reasons why people save (see Campbell, 1987, and Leland, 1968).

Tobin and Dolde (1971) argued that many households are not able to consume their permanent income because they are liquidity, or credit, constrained, i.e. not able to access funds against future income or illiquid assets they may hold. In times when current income falls below permanent, this means that consumption is dictated by the former. In a regression using permanent income, the marginal propensity to consume as a consequence is estimated to fall below unity. Credit constraints have been studied by a number of authors (e.g. Hayashi, 1985, Zeldes, 1989, and Jappelli, 1990). Generally, they find that young households tend to be liquidity constrained, as are those with poor education, without work and with little wealth. Deaton (1991) that in the presence of liquidity constraints, consumers will save to create a buffer stock of assets that can be used later on to finance consumption expenditure if income declines and the constraints begin to bind. Bacchetta and Gerlach (1997) show in a cross-country study that credit constraints seem to vary over time and affect consumption.
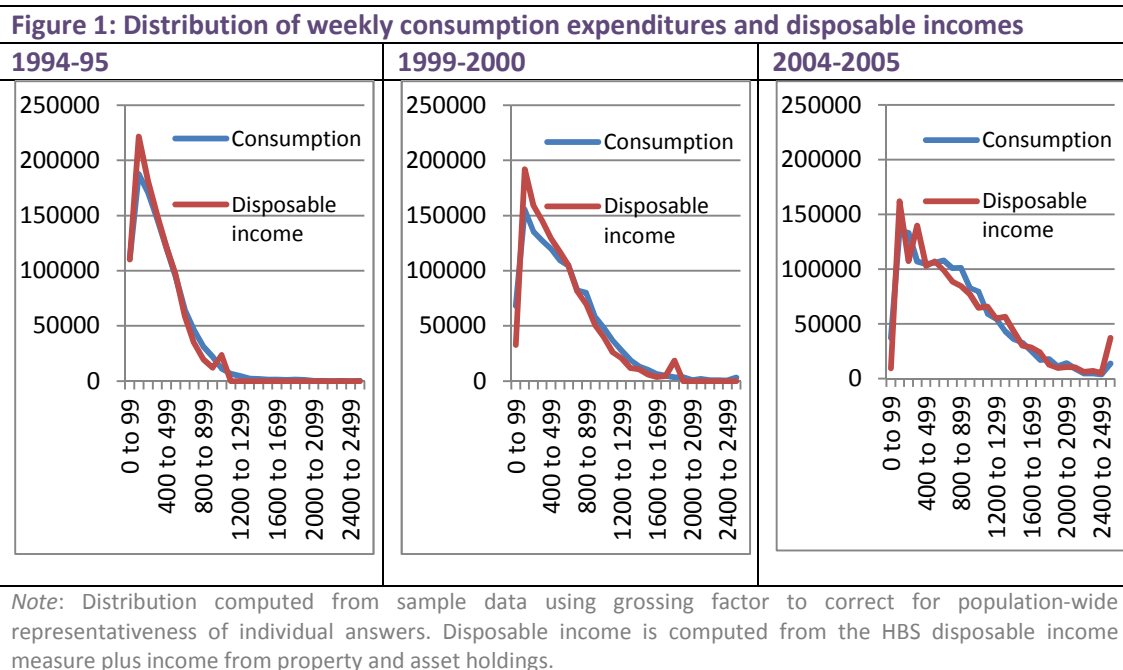
Ando and Modigliani (1963) were the first to study how wealth affects consumption. This question received renewed attention when house prices started rising. A non-exhaustive list of authors that examine the wealth effect of housing includes Benito and Mumtaz (2006) for the UK, Duca, Muellbauer and Murphy (2011) for the US, Slacalek (2009) for a cross-country study and Barrett, Kearney and O'Brien (2007) and Lydon and O'Hanlon (2012) for Ireland. Using pre-crisis macro data, Barrett, Kearney and O'Brien (2007) find that housing wealth has a transitory effect on consumption. Lydon and O'Hanlon (2012) also consider crisis data and find that more housing wealth increases the marginal propensity to consume and raises expenditure through equity withdrawal effects. Also relating to housing finance, Engelhardt

(1996) and Balta and Ruscher (2011) show that households that plan to buy a property tend to reduce consumption to save up for this purchase. They refer to this as the down-payment channel.

3. The data

Since income is the major variable driving consumption, we present as a starting point for the analysis population distributions for these two variables in Figure 1. It can be seen how the growth of the Celtic tiger years increased the number of households with high income and consumption. While the median weekly household income corresponded to 301 euros (237 Irish pounds) in 1994-95, this number increased to 462 euros in the 1999-2000 HBS and 765 euros in 2004-05. Similarly, weekly consumption of the median household rose from an equivalent of 330 euros in 1994-95 to 503 and then 689 euros.

Two points are worth noting. First, income and consumption distributions for any given HBS are very similar. Income thus seems to explain directly most of consumption. Second, the median household consumed more than it earned in disposable income in 1994-95 and in 1999-2000, but not in 2004-05. It seems plausible that the high consumption captured in the early surveys reflects the expectation of future income growth. Households that value smooth consumption would rationally increase consumption before the actual rise in income takes place. The drop in the median household's consumption relative to disposable income might relate to reduced income expectations. However, as we shall show below, it seems to be driven at least in part by increased savings of mortgage holders and thus may be related to the property price bubble.

Figure 1: Distribution of weekly consumption expenditures and disposable incomes

Note: Distribution computed from sample data using grossing factor to correct for population-wide representativeness of individual answers. Disposable income is computed from the HBS disposable income measure plus income from property and asset holdings.

What explains consumption? What household characteristics matter, how important is unemployment and how do loans and mortgages affect expenditures? Section 4 seeks to provide answers using three groups of explanatory variables. The first of these are demographic factors, such as the age of the family head, the household size, the number of dependents and so on. The second group comprises information on employment. The third captures financial circumstances and includes the number of loans, house ownership and the like. Table 1 shows summary statistics of these variables for the 1994-95 survey, Table 2 for the 1999-2000 survey and Table 3 for the 2004-05 survey.

We use dummy variables, count variables and continuous variables. For the latter, we drop the top and bottom 1% of observations. Of those continuous variables that are by construction non-negative, we use the logarithm in the estimation. For each of the variables we report the minimum and maximum values. Since we will estimate separate consumption functions for non-mortgage holders (i.e. outright house owners and renters) and mortgage holders, we report population medians for these two groups separately.[1]

In all surveys, it can be seen that non-mortgage households tended to earn less and have an older household head than mortgage households. Reflecting this age difference, non-mortgage households tend to be smaller, with children probably already moved out. The education level of household heads in this group, their social group and that of their spouse tends to be lower than that of mortgage holders. In the 2004-05 survey, non-mortgage household heads typically hold a junior certificate and are from the manual skilled social group; mortgage household heads tend to hold a leaving certificate and be lower professionals.[2]

Employment characteristics are similar for the two groups, with the median household head being employed and the only worker in the family. If the household head is unemployed, he has typically been so for 2 to 4 weeks. The main difference for the two groups is to be found for state transfer payments, which measures what fraction of income comes from the state. This variable captures unemployment benefits, state retirement pensions and other welfare benefits. Here, the median non-mortgage household receives some support in all three surveys, in the range of 20 to 30% of total income. The median mortgage household is not in receipt of such payments.

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[1] We include households that do not pay rent in the group of non-mortgage holders.
[2] It should be noted that we convert these categorical variables into cardinal ones, thus implicitly assuming that the different categories are equidistant and relate linearly to consumption. We do not use the "social group" variables for the 1994-95 dataset, since the definition differed in that survey and does not lend itself to linearisation.

Table 1: Variables used in the regression – summary statistics for the 1994-95 HBS				
Variable	Minimum	Maximum	Population median	
			No mortgage	Mortgage
Income	64 euros	1160 euros	241 euros	431 euros
Demographics				
Age group	0 (15-24 years)	6 (75 years plus)	3 (45-54 years)	2 (35-44 years)
Household size	1	11	2	4
Household members below 14 years of age	0	7	0	1
Household members above 65 years of age	0	3	0	0
Rural household	0	1	0	0
Education of household head*	0 (no formal education)	6 (higher university degree)	1 (junior certificate or equivalent)	2 (junior certificate or equivalent)
Male household head*	0	1	1	1
Employment				
Self-employed	0	1	0	0
Farmer	0	1	0	0
Household head and spouse work	0	1	0	0
Household head retired	0	1	0	0
One retired, one works	0	1	0	0
Household head unemployed	0	1	0	0
One unemployed, one works	0	1	0	0
Both unemployed	0	1	0	0
Time in unemployment	0	60 years plus	[For those unemployed]: 3 weeks	[For those unemployed]: 3 weeks
State transfer payments	0 (if support, less than 20% of income)	10 (all income from state)	20 to 30%	0
Financial variables				
Number of years spent at current residence	0	99 plus	19	10
House owner without a mortgage	0	1	1	NA
Number of non-mortgage loans	0	9	0	1
Original mortgage amount	0	73,010 euros	NA	25,395 euros
Remaining principal outstanding/original mortgage amount	0	18.0%	NA	1.6%
Remaining principal outstanding/disposable annual income	0	15.9%	NA	1.7%
Mortgage payment/ disposable income	0	98.8%	NA	11.1%
Interest only payment	0	1	NA	NA
Arrears	0	1	NA	0

* Only used in first-stage regression (1).

Table 2: Variables used in the regression – summary statistics for the 1999-2000 HBS				
Variable	Minimum	Maximum	Population median	
			No mortgage	Mortgage
Income	88 euros	1932 euros	355 euros	629 euros
Demographics				
Age group	0 (15-24 years)	6 (75 years plus)	4 (55-64 years)	2 (35-44 years)
Household size	1	11	2	4
Household members below 14 years of age	0	7	0	1
Household members above 65 years of age	0	3	0	0
Rural household	0	1	0	0
Education of household head*	0 (no formal education)	6 (higher university degree)	2 (junior certificate or equivalent)	2 (junior certificate or equivalent)
Male household head*	0	1	1	1
Social group of household head*	1 (managerial)	10 (unclassified)	5 (manual semi-skilled)	4 (manual skilled)
Social group of spouse*	1 (managerial)	10 (unclassified)	5 (manual semi-skilled)	4 (manual skilled)
Employment				
Self-employed	0	1	0	0
Farmer	0	1	0	0
Household head and spouse work	0	1	0	0
Household head retired	0	1	0	0
One retired, one works	0	1	0	0
Household head unemployed	0	1	0	0
One unemployed, one works	0	1	0	0
Both unemployed	0	1	0	0
Time in unemployment	0	60 years plus	[For those unemployed]: 3 weeks	[For those unemployed]: 2 weeks
State transfer payments	0 (if support, less than 20% of income)	10 (all income from state)	20 to 30%	0
Financial variables				
Number of years spent at current residence	0	99 plus	22	10
House owner without a mortgage	0	1	1	NA
Number of non-mortgage loans	0	9	0	1
Original mortgage amount	0	83,803 euros	NA	34,283 euros
Remaining principal outstanding/original mortgage amount	0	1773.1%	NA	1.5%
Remaining principal outstanding/disposable annual income	0	15.4%	NA	1.5%
Mortgage payment/ disposable income	0	92.8%	NA	9.7%
Interest only payment	0	1	NA	NA
Arrears	0	1	NA	0

* Only used in first-stage regression (1).

Table 3: Variables used in the regression – summary statistics for the 2004-05 HBS				
Variable	Minimum	Maximum	Population median	
			No mortgage	Mortgage
Income	134 euros	3148 euros	517 euros	1018 euros
Demographics				
Age group	0 (15-24 years)	6 (75 years plus)	4 (55-64 years)	2 (35-44 years)
Household size	1	11	2	3
Household members below 14 years of age	0	7	0	0
Household members above 65 years of age	0	3	0	0
Rural household	0	1	0	0
Education of household head*	0 (no formal education)	6 (higher university degree)	2 (junior certificate or equivalent)	3 (leaving certificate or equivalent)
Male household head*	0	1	1	1
Social group of household head*	0 (managerial)	10 (unclassified)	6 (manual unskilled)	4 (manual skilled)
Social group of spouse*	1 (managerial)	10 (unclassified)	6 (manual unskilled)	4 (manual skilled)
Employment				
Self-employed	0	1	0	0
Farmer	0	1	0	0
Household head and spouse work	0	1	0	0
Household head retired	0	1	0	0
One retired, one works	0	1	0	0
Household head unemployed	0	1	0	0
One unemployed, one works	0	1	0	0
Both unemployed	0	1	0	0
Time in unemployment	0	60 years plus	[For those unemployed]: 2 weeks	[For those unemployed]: 4 weeks
State transfer payments	0 (if support, less than 20% of income)	10 (all income from state)	20 to 30%	0
Financial variables				
Number of years spent at current residence	0	99 plus	22	8
House owner without a mortgage	0	1	1	NA
Number of non-mortgage loans	0	9	0	1
Original mortgage amount	0	328,862 euros	NA	69,836 euros
Remaining principal outstanding/original mortgage amount	0	18.7%	NA	1.5%
Remaining principal outstanding/disposable annual income	0	31.6%	NA	1.8%
Mortgage payment/ disposable income	0	137.1%	NA	9.1%
Interest only payment	0	1	NA	0
Arrears	0	1	NA	0

* Only used in first-stage regression (1).

Financial variables, finally, differ considerably between the two groups. The median non-mortgage household has been living in the same place for about 20 years. Mortgage households have moved more recently: the median length of residence at the current place is below 11 years. Non-mortgage households typically own their place outright and hold no loans. The median mortgage household holds one non-mortgage loan. The original mortgage for this household increased from about 25,000 euros in 1994-95 to almost 70,000 euros in 2004-05.[3] Typically, only little of the mortgage remains outstanding (around 1.5%) and this amount is small relative to disposable annual income (between 1.5% and 1.8%). Mortgage payments amounted to 11% of income for the median household in 1994-95, and fell to 9% in 2004-05. The fraction of mortgage households in arrears – which we define as those households that missed their last mortgage payment – decreased over time, from 14.0% in 1994-95 to 1.5% in 2004-05.

Overall, mortgage households seemed to earn more than non-mortgage households, to be younger, more educated and mainly professionals. They tended to have moved places more recently and to depend less on state transfers than households that either rent their place or own it outright. With these differences in mind, we turn to studying consumption for these two population groups.

4.   Regression analysis

4.1 General setup

To analyse consumption in Ireland, we start from the general specification

$$C_j = \alpha Y_{perm,j}^{\beta},$$

where C_j is the consumption of household j, $Y_{perm,j}$ a measure of its permanent income discussed below, β the income elasticity of consumption (also called the marginal propensity to consume) and α a shift factor. Taking logarithms and adding an error term for the estimations yields

$$c_j = \log(\alpha) + \beta y_{perm,j}$$

where lower case Latin letters denote logarithms. In the estimation, we allow α and β to differ across households according to their demographics, employment situation and financial situation.

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[3]   Glick and Lansing (2011) show how high growth rates in household debt between 1997 and 2007 correlate with declines in consumption in 2008 and 2009. Ireland is the country in their sample with the largest debt growth and the steepest decline in consumption. Walshe and O'Leary (2012) review Irish households' net wealth and the need for deleveraging. For international analyses on deleveraging, see McKinsey (2010), Isaksen, Kramp, Sørensen and Sørensen (2011) and IMF (2012).

4.2 Permanent income

Since Friedman (1957) the consumption literature has linked consumption to permanent income. The permanent income hypothesis states that individuals who are not constrained in their borrowing should smooth consumption over the life cycle, with the level of consumption determined by average life-time income, i.e. permanent income. Of course, consumption levels will not be totally stable of the life cycle, with children arriving and departing and leisure and health changing over time. Nevertheless, after taking into account such factors and any borrowing constraints, permanent income should be the main determinant of consumption.

In time-series analysis permanent income is often proxied by realised future income. This type of data is not available in a cross-section analysis. Instead, we approximate permanent income using observable individual characteristics. Below, this will be done as a first-step regression in the estimation of the consumption function. To illustrate the procedure and to discuss one important caveat, we here present this step of the analysis here explicitly.

We assume that permanent income depends on the education level of the household head, the household head's social group (which ranges from "managerial" to "not classified") as well as that of the spouse and the gender of the household head.[4] Disposable income is assumed to deviate randomly from permanent income. Thus,

$$y_{disp,j} = y_{perm,j} + v_j,$$

with $v_j \sim N(0, \sigma^2)$. Our estimate of permanent income corresponds to the fitted value in the regression

$$y_{disp,j} = \gamma + \gamma_{edu} education_j + \gamma_{gen} gender_j$$
$$+\gamma_{soc} socialclass_j + \gamma_{socsp} socialclass\_spouse_j + v_j. \qquad (1)$$

We report the regression output in Table 4. It seems that income tends to be highest for educated men in managerial positions whose wives also are managers. The adjusted R squareds range between 0.265 and 0.303, suggesting that the correlation of these variables with disposable income is appropriate for them to be used as instruments.[5, 6]

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[4] Data on the education of the household head's spouse are limited, and to avoid losing observations, we do not include this variable in equation (1). Also, we do not use the social group variables for the 1994-95 survey; see footnote 2.

[5] It should be noted that we do not use the right-hand side variables of equation (1) in the second-stage regression (2) below.

[6] The HBS asks respondents if the gross income they state (from which disposable income is computed) corresponds to their usual gross wage or salary. If the answer is no, the survey asks for the usual gross income. In the 2004/05 survey, 428 respondents gave an answer to this question. Our measure of permanent (disposable) income has a correlation of 0.36 with this usual gross income.

Table 4: Permanent income regression			
	1994-95	1999-2000	2004-05
γ	5.720***	6.582***	7.100***
γ_{edu}	0.240***	0.119***	0.089***
γ_{gen}	-0.468***	-0.338***	-0.254***
γ_{soc}		-0.020***	-0.027***
γ_{socsp}		-0.067***	-0.075***
Adjusted R2	0.303	0.265	0.265

One important caveat in this exercise is that our measure of permanent income captures the income a person with certain characteristics may expect to earn at a certain point in time. If the economy grows and most households will earn higher income in the future, our measure underestimates permanent income. Depending on how costly it is to borrow against future income (relative to the household's discount factor), consumption may be high before the income growth has been realised and appear high compared with current income. In the consumption function, which we estimate next, the expectation of general income growth in the future therefore would lead households to consume a comparatively high share of $y_{disp,j}$. Our estimates of the marginal propensity to consume thus are upper bounds, particularly for the high growth years of the Celtic tiger era.

4.3 Consumption patterns over time

We estimate a consumption function of the form

$$c_j = a_0 + \sum_{dem} a_d + \sum_{emp} a_l + \sum_{fin} a_f + \left(\beta_0 + \sum_{dem} \beta_d + \sum_{emp} \beta_l + \sum_{fin} \beta_f\right) y_{disp,j} + e_j \quad (2)$$
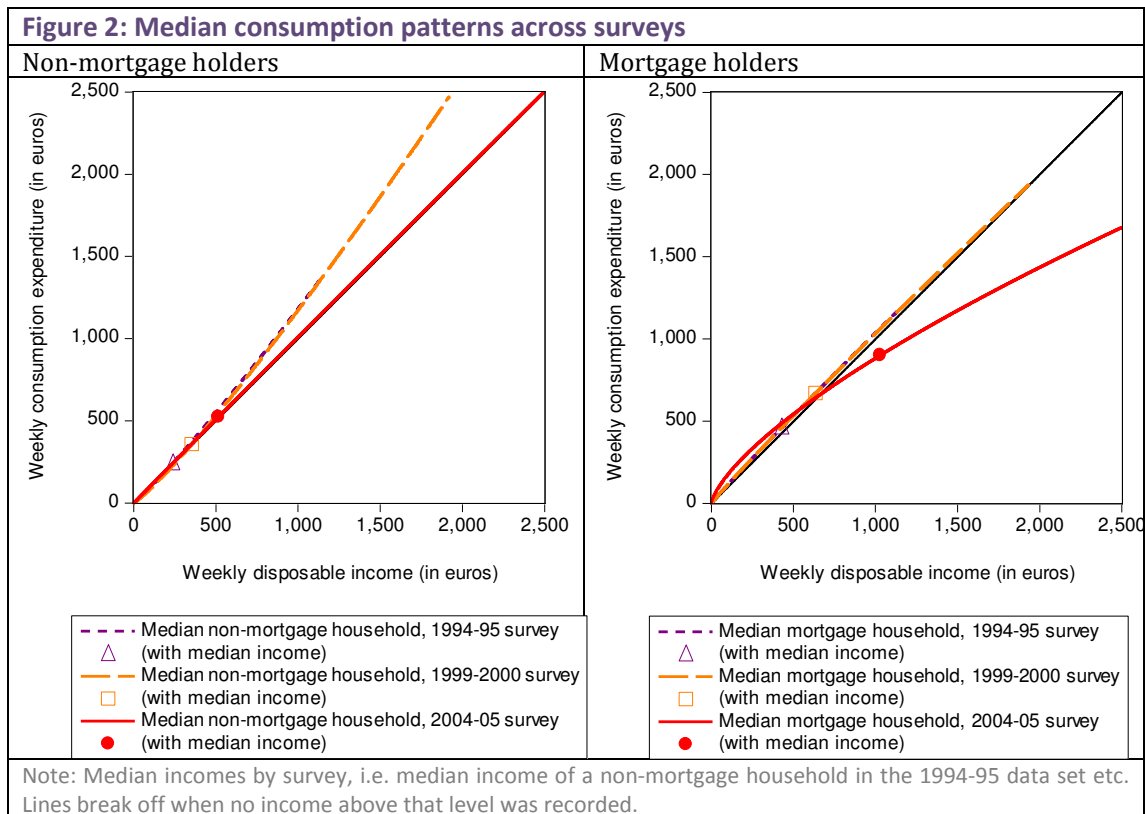
where $a = \log(\alpha)$. The summation signs reflect that we allow for different consumption patterns according to demographics (age of household head, size of household etc), the work situation (self-employed, unemployed etc) and the financial situation.

Since we would like to assess how holding a mortgage affects consumption, we split the sample into non-mortgage holders and mortgage holders and estimate the consumption function with a narrow set of financial variables (house ownership, number of loans) for the former and with a broad set (narrow set plus original mortgage amount, principal remaining outstanding etc) for the latter. We then estimate equation (2) using GMM, with equation (1) as the first-step regression, and successively drop insignificant variables until we reach a 5% significance level. We report the full regression output in the Appendix.

Table 5 shows the estimated marginal propensities to consume for the median household without and with a mortgage for the three surveys. It seems that the median household without a mortgage tended to consume more than they earned in the 1990s. Consumption roughly coincided with disposable income in the 2004-05 survey. The median mortgage household apparently consumed close to disposable income in the 1990s, but in 2004-05, consumption fell short of disposable income, thus indicating savings.

Table 5: Estimated marginal propensities to consume of median households			
	1994-95	1999-2000	2004-05
$\beta_{non-mortgage}$	1.105	1.143	0.991
$\beta_{mortgage}$	0.956	0.952	0.700

What explains these marginal propensities to consume, and how sensitive are they to different income levels? Figure 2 shows simulations to answer these questions. We simulate consumption by varying weekly disposable income between 0 and 2,500 euros. Since in the 1994-95 and the 1999-2000 survey, the maximum observed income lay below 2,500 euros, we cut off the simulated consumption functions at the maximum recorded income at the time.

Figure 2: Median consumption patterns across surveys

Note: Median incomes by survey, i.e. median income of a non-mortgage household in the 1994-95 data set etc. Lines break off when no income above that level was recorded.

The left graph shows the consumption patterns for non-mortgage households, the right graph for mortgage households. The dotted purple lines show the consumption function for the median household in the 1994-95 survey, the dashed orange lines consumption in the 1999-2000 survey, and the solid red lines those for 2004-05. We also indicate for each survey and household group the median income. It can be seen clearly how they increased over time. For non-mortgage households, the median weekly disposable income rose from 241 euros in the 1994-95 survey to 355 euros five years later and 515 in 2004-05. Correcting for consumer price inflation, the 1999-2000 income of non-mortgage households was 303 euros at 1994 prices and the 2004-05 income was 381. Real income thus grew by 26%

between the first and the second HBS considered and by another 26% over the following five years. For mortgage-holding households, income rose from 421 euros to 629 euros and then 1018 euros in nominal terms or from 421 to 536 and 751 in real terms. Real incomes of this group of the population thus grew also by 26% over the first five-year period and by another 40% over the five following years.

Non-mortgage households' consumption in the 1990s is simulated to exceed disposable income for high-income earners. One explanation for the high consumption is that our approach of estimating permanent income in equation (1) leaves out macroeconomic growth prospects. Given the high GDP growth rates at the time, many households must have expected higher incomes in the future, and this may have been reflected in their consumption patterns. It is interesting that this effect is not visible in 2004-05, when consumption is close to disposable income at all income levels.

The right panel in Figure 2 shows that consumption for mortgage households was close to income in the 1994-95 and the 1999-2000 surveys at all income levels. Savings emerged when the housing boom was approaching its peak, and they were made by high-income earner.[7] In this context, it is interesting to note that the median mortgage increased from 25,395 euros in 1994-95 to 34,283 in 1999-2000 and then more than doubled to 69,836 euros within five years. Mortgages in 2004-05 thus were larger relative to income than previously. This higher debt burden may explain why households near the peak of the housing boom mortgage were saving so much. Alternatively, high house prices implied high down-payments and may have encouraged savings to move up the property ladder.

In sum, Figure 2 suggests that consumption patterns changed rather drastically with the housing boom. The fall in consumption relative to income may have been due either to a downward revision in expected future incomes or, perhaps more realistically, to planned property purchases.
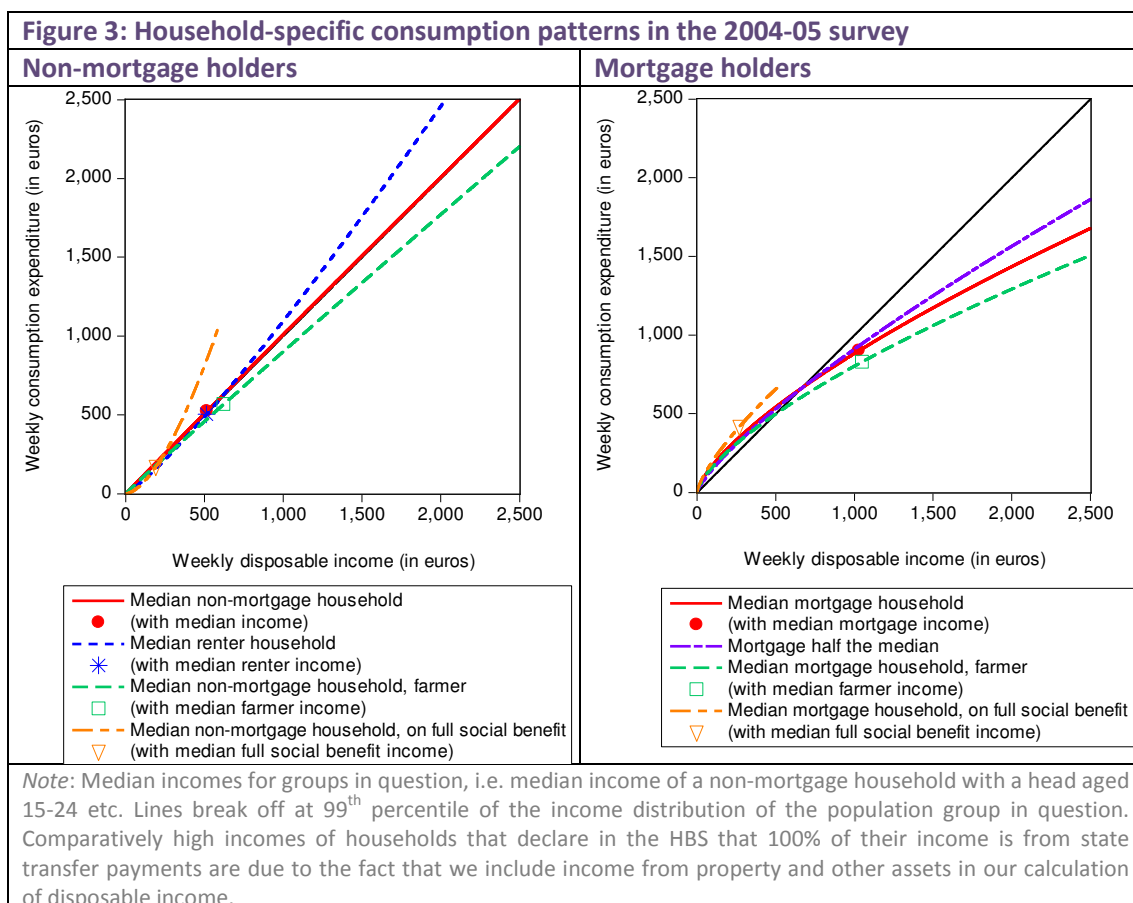
4.4 Household-specific consumption patterns in the 2004-05 survey

To get a better sense of consumption during the boom years, we concentrate next on the 2004-05 survey and assess how financial circumstances, as for instance the size of a mortgage, or employment characteristics, such as unemployment and retirement, impact on a household's consumption.

Figure 3 shows the simulated consumption patterns for different types of households. The left graph shows consumption patterns for non-mortgage households. The solid red line is the median household (age group 55 to 64 etc, as indicated in Table 3), which we already

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[7]   It is unlikely that this high savings rate reflects the impact of the Special Saving Incentive Account initiative. These accounts, on which the Irish government topped up the paid in sum by 25%, could be opened only in 2001 and 2002 and matured in 2006 and 2007.

discussed in Figure 2 above. Renting households (dotted blue line) tend to consume slightly less than they earn at low income levels but more as their income increases. This may be due to the expectation of future income growth. Farming households (dashed green line) tend to save more than the median as well. This probably reflects higher income uncertainty.[8] Non-mortgage households on state transfer payments (dash-dotted orange line) tend to consume close to income around their median income. Consumption is simulated to exceed income for higher income levels. In practice, however, there are few households with high income that receive state transfer payments.

Figure 3: Household-specific consumption patterns in the 2004-05 survey

Note: Median incomes for groups in question, i.e. median income of a non-mortgage household with a head aged 15-24 etc. Lines break off at 99th percentile of the income distribution of the population group in question. Comparatively high incomes of households that declare in the HBS that 100% of their income is from state transfer payments are due to the fact that we include income from property and other assets in our calculation of disposable income.

For the mortgage households, we find that consumption is higher, and savings lower, if the mortgage is smaller (long-dashed pink line). To the extent that the original mortgage size reflects the value of the house (on which the HBS unfortunately is silent), this is evidence against a wealth effect of housing. Instead, the fact that savings are smaller for smaller mortgages suggests that putting money aside for paying back the mortgage may indeed

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[8] Since the income elasticity of the "rural" dummy is estimated to be significantly positive, the fact that farmers save more does not seem to be related to a lower availability of loans in the countryside and liquidity constraints that might result from this.

matter. At the same time, the finding that at high income levels savings do not fall by half as we halve the mortgage also indicate other motivations for savings, such as plans to move up the property ladder.As for the non-mortgage households, farming mortgage households again save more than the median mortgage household, probably because of income uncertainty. Finally, mortgage households on state transfer payments tend to consume more than they earn. It is possible that this is consumption out of housing wealth in times of personal economic hardship.

5. Conclusions

This paper studies consumption patterns in Ireland using micro data from the 1994-95, the 1999-2000 and the 2004-05 Household Budget Surveys. We find that the median household without a mortgage consumed more than it earned in the 1990s – presumably building on expected income increases – and consumed about as much as it earned in 2004-05. The median household with a mortgage consumed roughly its income in the first two surveys but had started saving by 2004-05.

In a more detailed analysis of the 2004-05 survey, we find that households whose income stemmed entirely from state transfer payments consumed most of their disposable income. Savings were larger for farmers and for households that had a mortgage. We argue that farmers tend to save more because of the uncertainty of their income. Mortgage holders' savings in 2004-05 were related to the size of their original mortgage and thus probably reflected an attempt to put money aside to meet the resulting obligations. At the same time, plans to move up the property ladder may also have been a motivation for savings, especially for higher-income earners. Among the non-mortgage holders, we find that renters bracket consumed unusually much. This may have mirrored the expectation of further rises in income during the boom years.

The 2009-10 HBS data, which are scheduled to be published later in 2012, will allow an analysis of how consumption patterns in Ireland have changed since the end of the housing bubble.

Appendix

Tables A1 to A3 show the consumption function estimates for the three HBSs. There are some variables that matter only in one or two of the three surveys, though often they replace similar variables (e.g. in the 1994-95 survey, we find that "one person working, one retired" yields a marginal propensity to consume that differs from that estimated for the baseline household; in the 2004-05 survey, we find that "household head retired" matters instead).

Table A1: Consumption function estimates from the 1994-95 survey	Non-mortgage holders	Mortgage holders
a_0	1.923***	-9.988**
a_{age}	-0.373***	
$a_{household size}$	-0.818***	0.085***
$a_{under 14}$		-0.065***
$a_{selfemployed}$	0.071***	2.251**
a_{farmer}	1.623**	
$a_{both work}$		-2.479***
$a_{retired}$		0.115**
$a_{one person working, one retired}$	7.151***	
$a_{state transfer payment}$	-0.273***	0.478**
$a_{years at residence}$		-0.102***
$a_{number of non-mortgage loans}$		0.028***
$a_{original mortgage amount}$		1.197***
$a_{remaining principal outstanding-to-disposable income}$		-0.013***
$a_{mortgage payment-to-disposable income}$		0.015***
$a_{arrears}$		4.211***
β_0	0.670***	2.251**
β_{age}	0.062***	
$\beta_{over 65}$	-0.010***	
β_{rural}	0.011***	
$\beta_{selfemployed}$		-0.359**
β_{farmer}	-0.308***	
$\beta_{both work}$		0.391***
$\beta_{one person working, one retired}$	-1.200***	
$\beta_{both unemployed}$		0.066***
$\beta_{time in unemployment}$		9.0x10-4**
$\beta_{state transfer payment}$	0.059***	-0.089**
$\beta_{years at residence}$	-4.2x10-4***	0.018***
$\beta_{original mortgage amount}$		-0.218***
$\beta_{remaining principal outstanding-to-disposable income}$		0.002***
$\beta_{mortgage payment-to-disposable income}$		-0.005**
$\beta_{arrears}$		-0.729***
Number of observations	5228	2173
Adjusted R squared	0.642	0.540

Note: GMM estimates, White heteroscedastic errors. We instrument disposable income with the regressors in equation (1) to approximate permanent income. */**/*** denotes significance at the ten/five/one percent level.

J-tests for the exogeneity of the instruments for permanent income yield p-values of 0.056 (1994-95), 0.069 (1999-2000) and 0.148 (2004-05) for non-mortgage holders and 0.005

(1994-95), 0.472 (1999-2000) and 0.410 (2004-05) for mortgage holders. Education seems to have been related to mortgage holders' consumption in the first survey, but otherwise the instruments appear exogenous.

Table A2: Consumption function estimates from the 1999-2000 survey		
	Non-mortgage holders	Mortgage holders
a_0	2.911***	0.139***
a_{age}	-0.586***	0.042***
$a_{household\ size}$	-1.035***	
$a_{over\ 65}$		-3.362**
$a_{selfemployed}$	0.076**	0.110***
a_{farmer}		2.617**
$a_{both\ work}$	2.717***	
$a_{state\ transfer\ payment}$	-0.177**	0.367***
$a_{years\ at\ residence}$	-0.003***	
a_{owner}	0.052**	
$a_{remaining\ principal\ outstanding-to-disposable\ income}$		0.014***
β_0	0.537***	1.015***
β_{age}	0.092***	
$\beta_{household\ size}$	0.165***	0.006***
$\beta_{over\ 65}$		0.555***
β_{farmer}	-0.020***	-0.416**
$\beta_{both\ work}$	-0.427***	
$\beta_{one\ person\ working,\ one\ unemployed}$		0.016***
$\beta_{state\ transfer\ payment}$	0.037**	-0.063***
$\beta_{number\ of\ non-mortgage\ loans}$		0.006***
$\beta_{original\ mortgage\ amount}$		-0.009***
$\beta_{remaining\ principal-to-annual\ income}$		$1.14*10^{-4}$***
Number of observations	4732	2468
Adjusted R squared	0.589	0.573

Note: GMM estimates, White heteroscedastic errors. We instrument disposable income with the regressors in equation (1) to approximate permanent income. */**/*** denotes significance at the ten/five/one percent level.

17

Table A3: Consumption function estimates from the 2004-05 survey		
	Non-mortgage holders	Mortgage holders
a_0	0.466	-6.444**
$a_{household\ size}$		0.084***
$a_{under\ 14}$		-0.691***
$a_{over\ 65}$		-2.371***
$a_{selfemployed}$		2.034***
$a_{household\ head\ retired}$		0.168**
$a_{time\ in\ unemployment}$	0.017***	
$a_{state\ transfer\ payment}$	-0.433***	
$a_{years\ at\ residence}$	-0.030***	
a_{owner}	1.198***	
$a_{number\ of\ non-mortgage\ loans}$	0.034***	0.020***
$a_{original\ mortgage\ amount}$		0.743***
β_0	0.598***	1.951***
$\beta_{under\ 14}$		0.094**
$\beta_{over\ 65}$	-0.025***	0.340***
β_{rural}	0.007**	
$\beta_{selfemployed}$	0.009**	-0.285***
β_{farmer}	-0.016***	-0.014***
$\beta_{household\ head\ retired}$	0.013***	
$\beta_{one\ person\ working,\ one\ retired}$	0.018**	0.040***
$\beta_{time\ in\ unemployment}$	-0.002***	
$\beta_{state\ transfer\ payment}$	0.079***	0.003**
$\beta_{years\ at\ residence}$	0.004***	
β_{owner}	-0.175***	
$\beta_{number\ of\ non-mortgage\ loans}$	0.005***	
$\beta_{original\ mortgage\ amount}$		-0.114***
$\beta_{remaining\ principal-to-annual\ income}$		0.002***
Number of observations	4178	2289
Adjusted R squared	0.609	0.510

Note: GMM estimates, White heteroscedastic errors. We instrument disposable income with the regressors in equation (1) to approximate permanent income. */**/*** denotes significance at the ten/five/one percent level.

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